

The biosynthesis of ecdysteroids with plants
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A great problem nowadays is the protection of valuable agricultural plants from the destruction by insects. The class of insects develops simultaneously with the appearance of new chemical pest-killers that leads to environment pollution. To solve this actual problem there is the aim of the agricultural biotechnology to produce new kinds of plants resistant to illnesses and insects with the help of genetic engineering methods.

The aim of the research: to study delicate mechanism of ecdysteroids biosynthesis in the cultivation of *Serratula coronata* L. (*S. coronata* L.) cells and *Serratula cardunculus* Schischk (*S. cardunculus* S.).

Ecdysteroids represent hydroxylation sterols. They display hormone activity, causing insect moulting. Ecdysteroids are spread in plants. They are related to various taxonomic not concerned families. They are had both with the lowest and the highest plants, including annual and perennial plants. They are found in all organs of the plants, accumulating in apical parts of growing sprouts, in roots or in seeds. Phytoecdysteroids are used in medicine as medications of anabolic, adaptogenic and toning action and also as biostimulants in live-stock breeding. For instance, fern *Polypodium*, different kinds of *Ajuga*, *Serratula* and *Leuzea* (*Asteraceae*) can be referred to the plants being characterized by high contents of ecdysteroids.

The way of biosynthesis in plants and animals, perhaps mushrooms, are different. The predecessors of ecdysteroids are acetate, mevalonate, cholesterol, ketol, ketodiol, ecdyzon, ponasteron, 2,22-dioxyecdizon, 22,25-dioxyecdizon. Biosynthesis can be considered as formation during initial stages α -ecdyzon and ponasteron A. Ecdysterone contents in cell cultures in different species makes: *Rhaponticum carthamoids* – 0,001-0,01; *Serratula coronata* – 0,02-0,09; *Ajuga reptans* – 0,015-0,1. The structure of callus tissue, the speed of its growth depend on nutrition factors combination and illumination. On the whole ecdysteroids biosynthesis in suspension cultures is a little higher than in cell cultures. The perspective method of biotechnology is root transformed culture. While inoculation of sterile germs by cultures of *Agrobacterium rhizogenes* infection and agro bacterium transformation take place in the form of barbed roots. The advantage of the technology in comparison with field cultures becomes apparent in the kind of constant source of reproduction, fast growth and frequency of individuals' regeneration; exterior growth hormones are not required. Changed chemical mixture of secondary metabolites, acquired by the methods of biotechnology leads to the loss of biological activity that is characteristic of the plants.

It is interesting to point out how specific are the corresponding ferments: if they are not specific, then the probability of synthesis of several different molecules with comparatively small set of ferments. It is especially important if to take into account that plants also contain brassinosteroids – a new class of vegetative structurally relative ecdysteroid. Brassinosteroids biosynthesis is studied well and it is shown that stereochemistry of hydroxyl group in the position of C2 and C22 with these compounds is different from the corresponding hydroxyls with ecdysteroids. However, it can not be excluded that a number of reactions is accomplished by the same ferments in both groups of compounds and also while kardenolids biosynthesis. We can hope that the answer to this question will be received in the recent years owing to the fast development of molecular-genetic approaches to the problem. There was a success in isolation and in some cases cloning the genes responsible for the synthesis of some of those ferments.